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AVAGO TECHNOLOGIES, LTD.  
P.O. Box 1920  
Denver, Colorado 80201-1920

ATTORNEY DOCKET NO. 70020777-1

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Cheah Chiang Sun

Serial No.: 10/692,879

Examiner: Boddie, William

Filing Date: October 23, 2003

Group Art Unit: 2629

Title: Improved Pen Mouse

COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria VA 22313-1450

## TRANSMITTAL LETTER FOR RESPONSE/AMENDMENT

Sir:

Transmitted herewith is/are the following in the above-identified application:

- ☐ Response/Amendment
 ☐ Petition to extend time to respond  
☐ New fee as calculated below
 ☐ Supplemental Declaration  
☐ No additional fee (Address envelope to "Mail Stop Amendments")  
☒ Other: Appeal Brief (Fee \$500 )

CLAIMS AS AMENDED BY OTHER THAN A SMALL ENTITY						
(1) FOR	(2) CLAIMS REMAINING AFTER AMENDMENT	(3) NUMBER EXTRA	(4) HIGHEST NUMBER PREVIOUSLY PAID FOR	(5) PRESENT EXTRA	(6) RATE	(7) ADDITIONAL FEES
TOTAL CLAIMS		MINUS		= 0	x 50	\$ 0
INDEP. CLAIMS		MINUS		= 0	x 200	\$ 0
<input type="checkbox"/> FIRST PRESENTATION OF A MULTIPLE DEPENDENT CLAIM					+ 360	\$ 0
EXTENSION FEE	1 <sup>ST</sup> MONTH 120.00 <input type="checkbox"/>	2 <sup>ND</sup> MONTH 450.00 <input type="checkbox"/>	3 <sup>RD</sup> MONTH 1020.00 <input type="checkbox"/>	4 <sup>TH</sup> MONTH 1590.00 <input type="checkbox"/>		\$ 0
OTHER FEES						\$ 500
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT						\$ 500

Charge \$500 to Deposit Account 50-3718. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 50-3718 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 50-3718 under 37 CFR 1.16, 1.17, 1.19, 1.20 and 1.21. A duplicate copy of this transmittal letter is enclosed.

Respectfully submitted,  
Cheah Chiang Sun

By

Calvin B. Ward  
Attorney/Agent for Applicant(s)

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office on the date shown below:

Date of facsimile: Oct. 3, 2006

Typed Name: Calvin B. Ward

Signature: 

Reg. No. 30,886

Date: Oct. 3, 2006

Telephone No. 925-855-0413

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PATENT APPLICATION  
Attorney Docket: 70020777-1**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF APPEALS**

Applicant:	Sun
Serial No.:	10/692,879
Filed:	10/23/2003
For:	Improved Pen Mouse
Group Art Unit:	2629
Examiner:	Boddie, William

**BRIEF FOR APPELLANT**

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This is an appeal from the decision of the Primary Examiner dated 08/08/2006, finally rejecting Claims 1-6 in the above-identified patent application.

**I. REAL PARTY IN INTEREST**

The real party in interest is Avago Technologies, LTD. having an address as indicated below.

**II. RELATED APPEALS AND INTERFERENCES**

There are no other appeals or interferences known to appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in this pending appeal.

**III. STATUS OF THE CLAIMS**

Claims 1-6 are currently pending in the above-identified patent application. In the Office Action dated 08/08/2006, the Examiner rejected Claims 1-6 and indicated that the Action was final.

10/04/2006 MBINAS 00000006 503718 10692879  
02 FC:1482 500.00 DA

#### **IV. STATUS OF AMENDMENTS**

No amendments have been filed since the above-described final rejection.

#### **V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

With respect to Claim 1, refer to Figure 2, and the discussion thereof that begins on page 4 at line 19. The present invention includes a pointing device 20 that includes an elongated body 21 having a transparent end adapted for movement over a surface 13. The pointing device includes an illumination subsystem 24 that illuminates the surface in an area adjacent to the transparent end 22. An imaging subsystem 23 forms images of a portion of the surface in the area. A reference mark system 25-27 defines a direction that is independent of the rotations of the elongated body. The reference mark's position relative to the elongated body is determined by the image subsystem in the embodiment shown in Figure 2. A controller 28 periodically compares two of the images formed by the image subsystem in a manner that depends on the amount by which the elongated body rotated between the images as determined from the orientation measured by the reference mark system.

With reference to Claim 2, the reference mark system includes a disk 25 that is free to rotate about an axis 27 through the disk. The disk includes a reference mark 26 that is displaced from the axis, the disk having an orientation mechanism that maintains the disk in a fixed orientation relative to the earth. The reference mark system includes a sensor for determining the location of the reference mark relative to the elongated body. This function can be provided by the sensor in the imaging subsystem or a separate sensor 43 shown in Figure 4.

With respect to Claim 3, the orientation mechanism includes a weight on the disk that is displaced from the axis as shown in Figure 5 at 51.

With respect to Claim 4, the orientation mechanism includes a magnet attached to the disk as shown at 63 in Figure 6 and discussed starting on page 6 at line 26.

With respect to Claim 5, the sensor used to measure the position of the reference mark includes an optical system for projecting an image of the disk into the imaging subsystem.

See Figure 3, specifically mirror 34 and reference mark system 31-33 and the discussion thereof that begins on page 5 at line 26.

With respect to Claim 6, the sensor includes a reference mark sensor 43 that measures the orientation of the disk relative to the elongated body as shown in Figure 4.

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

A. Rejection of Claims 1-3 and 5-6 under 35 U.S.C. 103(a) as being unpatentable over Badyal, *et al* (hereafter "Badyal") (US 6,151,015) in view of Howard (US 6,097,374).

B. Rejection of Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Badyal in view of Howard and further in view of Blonder (US 5,620,371)

## **VII. ARGUMENT**

### **A. Examiner's Burden under 35 U.S.C. 103**

The Examiner has the burden of showing that the combined teachings of the references teach all of the limitations of the claim being rejected. If the combined references do not teach a limitation, the Examiner must show that there is some suggestion in the art that would cause someone of ordinary skill to modify the teachings of the reference to arrive at the limitation in question. In addition, the Examiner must show that there is some suggestion in the art that would cause someone of ordinary skill to combine the teachings of the references and that the art reveals that there is a reasonable expectation of success in making the suggested combination. "The mere fact that a reference could be modified to produce the patented invention would not make the modification obvious unless it is suggested by the prior art." (*Libbey-Owens-Ford v. BOC Group*, 4 USPQ 2d 1097, 1103). "When the PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where such a teaching or suggestion appears in the reference" (*In re Rijckaert*, 28 USPQ2d, 1955, 1957). Where the claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under section 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in

so making or carrying out, those of ordinary skill would have a reasonable expectation of success. Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure. *In re Vaack*, 20 USPQ2d 1438, 1442(CAFC 1991).

**B. Rejection of Claims 1-3 and 5-6 under 35 U.S.C. 103(a) as being unpatentable over Badyal in view of Howard**

**1. Rejection of Claim 1**

The Examiner looks to Badyal as teaching a pen-like pointing device that satisfies the limitations of Claim 1 with the exception of the reference mark system and comparing the two images in a manner that depends on the amount by which the body rotated between the images. The Examiner looks to Howard for the missing teaching.

The Examiner looks to Howard as providing the teaching of a reference system that defines a direction that is independent of the rotations of a body. According to the Examiner, one would be motivated to include the reference mechanism of Howard in the pointing device of Badyal because doing so would allow more flexibility to the user and allow rotation of the pen within the user's grasp. The Examiner maintains that Badyal "struggles" with determining the rotation of the pen, and hence, one would be motivated to include the system taught in Howard to provide a mechanism for determining the rotation.

First, contrary to the Examiner's view, Badyal does not struggle with determining the rotation of the pen. Badyal teaches a pen like pointing device in which the rotation of the pen is determined by comparing successive frames recorded by the image sensor. The algorithm involves comparing a first image with a second image after the second image has been translated or rotated. The algorithm used therein is clearly capable of determining the rotation of the pen as Badyal refers to determining that rotation by comparing successive images [col. 3, lines 37-41]. Hence, the device taught by Badyal is already capable of determining the rotation of the pen without any further teachings from Howard. The Examiner has not pointed to any teaching in the art that the scheme taught in Howard has any advantages over the scheme already present in Badyal.

The passage at col. 3, lines 42-61 cited by the Examiner as supporting the Examiner's contention that Badyal struggles with determining the rotation of the pen refers to calibrating

the pointing system to define the direction of motion of the cursor on the screen with respect to the direction of motion of the pen. The passage also states that the rotation of the pen by the user can be used as a signal to define the direction of motion. Hence, there is no teaching in Badyal that the device taught therein cannot determine the rotation of the pen, or that the operation thereof is hampered in any way by an inability to determine the rotation of the pen.

Claim 1 also requires that the reference mark system measures the orientation of the elongated body relative to the direction defined by the reference mark system. The system taught by Howard generates signals that only measure changes in the orientation of the glove relative to the defined direction. The system taught in Howard is an incremental optical encoder that generates a pulse each time the disk moves some predetermined angular distance. The Examiner has not pointed to any teaching in Howard that the device taught therein measures the orientation of the glove relative to the direction defined by the disk. While one could construct a system that provides such an absolute measurement by defining a predetermined reference position, the Examiner has not pointed to any such teaching in the references. Hence, such a teaching is not inherent in the references.

The device taught by Howard determines the orientation of a glove relative to a direction defined by the gravitational force acting on a weight. The information is used to control a cursor on a screen. There is no teaching in either Howard or Badyal that the comparison of the images taken by the device of Badyal could be modified if the orientation of the pen in Badyal was known from a separate measurement. Hence, the combined teachings of the two references do not teach the limitation that the comparison of the images depends on a measured orientation of the pen, no less the orientation provided by the reference system identified by the Examiner. Accordingly, Applicant submits that the Examiner has not made a *prima facie* case for obviousness with respect to Claim 1.

## 2. Rejection of Claims 2 and 3

The Examiner stated that Badyal and Howard disclose the pointing device of Claim 1 and that Howard further discloses a reference mark system that satisfies the additional limitations of Claim 2. Namely, that the reference mark system includes a sensor for determining the location of a reference mark on the disk relative to the elongated body. Specifically, the Examiner looks to the system shown in Figure 8b of Howard and identifies

weight 76 as the reference mark. Applicant must respectfully disagree with the Examiner's reading of the cited teachings in Howard.

The reference device taught in Howard consists of a disk that is weighted and turns when the orientation of the device is altered with respect to the earth. The disk turns an encoding wheel 72 having a set of identical marks on the wheel. The number of marks that pass sensor 78 are counted to determine the amount by which the hand moved since the last measurement; however, there is no teaching that the position of any particular mark is determined. The device measures the amount of change since the last position measurement, not the absolute position of the device to which the mechanism is attached. This device generates a signal that is analogous to that generated by a conventional computer mouse. Hence, the combined references do not teach all of the limitations of Claim 2. Accordingly, the Examiner has not made a *prima facie* case for obviousness with respect to Claim 2 or the claims dependent therefrom. The previous amendment to Claim 2 merely places the claim, as originally filed, in independent form.

### 3. Rejection of Claim 5

Claim 5 depends from Claim 2 and further requires that the sensor that determines the location of the reference mark relative to the elongated body include an optical system for projecting an image of the disk into the imaging system that forms images of the surface over which the pen is moved. The Examiner states that Howard teaches that the sensor forms an image of the disk because an LED-phototransistor pair is used to detect the reference marks on the disk. Applicant repeats the arguments made above with respect to the missing teachings in the references and Claim 2.

In addition, the device taught by Howard utilizes an encoding wheel that is rotated by the disk in question. The encoding wheel includes slots. A light source 77 projects a collimated beam of light that is interrupted by the slot pattern to generate a series of light pulses that are detected by element 78. This optical system does not form an image of the encoding wheel, no less the disk on which the weight is located, i.e., disk 75, as required by Claim 5. Furthermore, the Examiner has not pointed to any teaching that the "image" identified by the Examiner is formed or would be formed in the imaging sub-system used to form images of the surface. Accordingly, there are additional grounds for allowing Claim 5.

#### 4. Rejection of Claim 6

The Examiner stated that Howard teaches a reference mark sensor that measures the orientation of the disk relative to the elongated body. First, Howard does not teach an elongated body. Second, as noted above, the system shown in Figure 8b measures changes in the orientation of the object to which the device is attached, not the absolute orientation. Hence, there are additional grounds for allowing Claim 6.

#### C. Rejection of Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Badyal in view of Howard and further in view of Blonder

Claim 4 depends from Claim 2 and further requires that the orientation sensor includes a magnet attached to the disk. The Examiner admits that Badyal in view of Howard does not teach such a magnet. The Examiner looks to Blonder as teaching a sensor having a magnet in a pointing device. The Examiner maintains that it would be obvious to replace the weight of Howard with a magnet according to Blonder so that the device could be used when gravity would be ineffective, such as movement perpendicular to the force of gravity.

First, the Examiner has not pointed to any teaching in Howard that a device that is independent of gravity is useful. The purpose of the device taught in Howard is to measure changes in the orientation of the user's hand relative to the direction of gravity. Hence, the resultant device would not provide the functionality to which the device in Howard is directed.

Second, Applicant repeats the arguments made above with respect to the missing teachings in Badyal and Howard relative to the rejection of Claim 2. Blonder does not provide the missing teachings. Accordingly, the Examiner has not made a *prima facie* case for obviousness with respect to Claim 4.

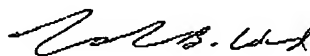
#### VIII. CONCLUSION

Appellants respectfully submit that for the reasons of fact and law argued herein, the decision of the Examiner in finally rejecting Claims 1-6 should be reversed.



I hereby certify that this paper (along with any others attached hereto) is being sent in triplicate via facsimile to fax number: 571-273-8300

Respectfully Submitted,



Calvin B. Ward  
Registration No. 30,896  
Date: Oct. 3, 2006

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APPENDIX

**THE CLAIMS ON APPEAL:**

1. A pointing device comprising:

an elongated body having a transparent end adapted for movement over a surface;

an illumination subsystem that illuminates said surface in an area adjacent to said transparent end;

an imaging subsystem that forms images of a portion of said surface in said area;

a reference mark system that defines a direction that is independent of the rotations of said elongated body and measures the orientation of said elongated body relative to said direction; and

a controller that periodically compares two of said images, said comparison depending on the amount by which said elongated body rotated between said images as determined from said orientation.

2. A pointing device comprising:

an elongated body having a transparent end adapted for movement over a surface;

an illumination subsystem that illuminates said surface in an area adjacent to said transparent end;

an imaging subsystem that forms images of a portion of said surface in said area;

a reference mark system that defines a direction that is independent of the rotations of said elongated body; and

a controller that periodically compares two of said images, said comparison depending on the amount by which said elongated body rotated between said images,

wherein said reference mark system comprises:

a disk that is free to rotate about an axis through said disk, said disk comprising a reference mark that is displaced from said axis, said disk having an orientation mechanism that maintains said disk in a fixed orientation relative to the earth; and

a sensor for determining the location of said reference mark relative to said elongated body.

3. The pointing device of Claim 2 wherein said orientation mechanism comprises a weight on said disk, said weight being displaced from said axis.

4. The pointing device of Claim 2 wherein said orientation mechanism comprises a magnet attached to said disk.

5. The pointing device of Claim 2 wherein said sensor comprises an optical system for projecting an image of said disk into said imaging subsystem.

6. The pointing device of Claim 2 wherein said sensor comprises a reference mark sensor that measures the orientation of said disk relative to said elongated body.

**Evidence Appendix**

**none**



**Related Proceedings Appendix**

**none**

OCT 03 2006

PATENT APPLICATION

Attorney Docket: 70020777-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF APPEALS

Applicant:	Sun
Serial No.:	10/692,879
Filed:	10/23/2003
For:	Improved Pen Mouse
Group Art Unit:	2629
Examiner:	Boddie, William

BRIEF FOR APPELLANT

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This is an appeal from the decision of the Primary Examiner dated 08/08/2006, finally rejecting Claims 1-6 in the above-identified patent application.

**I. REAL PARTY IN INTEREST**

The real party in interest is Avago Technologies, LTD. having an address as indicated below.

**II. RELATED APPEALS AND INTERFERENCES**

There are no other appeals or interferences known to appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in this pending appeal.

**III. STATUS OF THE CLAIMS**

Claims 1-6 are currently pending in the above-identified patent application. In the Office Action dated 08/08/2006, the Examiner rejected Claims 1-6 and indicated that the Action was final.

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**IV. STATUS OF AMENDMENTS**

No amendments have been filed since the above-described final rejection.

**V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

With respect to Claim 1, refer to Figure 2, and the discussion thereof that begins on page 4 at line 19. The present invention includes a pointing device 20 that includes an elongated body 21 having a transparent end adapted for movement over a surface 13. The pointing device includes an illumination subsystem 24 that illuminates the surface in an area adjacent to the transparent end 22. An imaging subsystem 23 forms images of a portion of the surface in the area. A reference mark system 25-27 defines a direction that is independent of the rotations of the elongated body. The reference mark's position relative to the elongated body is determined by the image subsystem in the embodiment shown in Figure 2. A controller 28 periodically compares two of the images formed by the image subsystem in a manner that depends on the amount by which the elongated body rotated between the images as determined from the orientation measured by the reference mark system.

With reference to Claim 2, the reference mark system includes a disk 25 that is free to rotate about an axis 27 through the disk. The disk includes a reference mark 26 that is displaced from the axis, the disk having an orientation mechanism that maintains the disk in a fixed orientation relative to the earth. The reference mark system includes a sensor for determining the location of the reference mark relative to the elongated body. This function can be provided by the sensor in the imaging subsystem or a separate sensor 43 shown in Figure 4.

With respect to Claim 3, the orientation mechanism includes a weight on the disk that is displaced from the axis as shown in Figure 5 at 51.

With respect to Claim 4, the orientation mechanism includes a magnet attached to the disk as shown at 63 in Figure 6 and discussed starting on page 6 at line 26.

With respect to Claim 5, the sensor used to measure the position of the reference mark includes an optical system for projecting an image of the disk into the imaging subsystem.



See Figure 3, specifically mirror 34 and reference mark system 31-33 and the discussion thereof that begins on page 5 at line 26.

With respect to Claim 6, the sensor includes a reference mark sensor 43 that measures the orientation of the disk relative to the elongated body as shown in Figure 4.

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

A. Rejection of Claims 1-3 and 5-6 under 35 U.S.C. 103(a) as being unpatentable over Badyal, *et al* (hereafter "Badyal") (US 6,151,015) in view of Howard (US 6,097,374).

B. Rejection of Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Badyal in view of Howard and further in view of Blonder (US 5,620,371)

## **VII. ARGUMENT**

### **A. Examiner's Burden under 35 U.S.C. 103**

The Examiner has the burden of showing that the combined teachings of the references teach all of the limitations of the claim being rejected. If the combined references do not teach a limitation, the Examiner must show that there is some suggestion in the art that would cause someone of ordinary skill to modify the teachings of the reference to arrive at the limitation in question. In addition, the Examiner must show that there is some suggestion in the art that would cause someone of ordinary skill to combine the teachings of the references and that the art reveals that there is a reasonable expectation of success in making the suggested combination. "The mere fact that a reference could be modified to produce the patented invention would not make the modification obvious unless it is suggested by the prior art." (*Libbey-Owens-Ford v. BOC Group*, 4 USPQ 2d 1097, 1103). "When the PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where such a teaching or suggestion appears in the reference" (*In re Rijckaert*, 28 USPQ2d, 1955, 1957). Where the claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under section 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in

so making or carrying out, those of ordinary skill would have a reasonable expectation of success. Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure. *In re Vaeck*, 20 USPQ2d 1438, 1442(CAFC 1991).

**B. Rejection of Claims 1-3 and 5-6 under 35 U.S.C. 103(a) as being unpatentable over Badyal in view of Howard**

**1. Rejection of Claim 1**

The Examiner looks to Badyal as teaching a pen-like pointing device that satisfies the limitations of Claim 1 with the exception of the reference mark system and comparing the two images in a manner that depends on the amount by which the body rotated between the images. The Examiner looks to Howard for the missing teaching.

The Examiner looks to Howard as providing the teaching of a reference system that defines a direction that is independent of the rotations of a body. According to the Examiner, one would be motivated to include the reference mechanism of Howard in the pointing device of Badyal because doing so would allow more flexibility to the user and allow rotation of the pen within the user's grasp. The Examiner maintains that Badyal "struggles" with determining the rotation of the pen, and hence, one would be motivated to include the system taught in Howard to provide a mechanism for determining the rotation.

First, contrary to the Examiner's view, Badyal does not struggle with determining the rotation of the pen. Badyal teaches a pen like pointing device in which the rotation of the pen is determined by comparing successive frames recorded by the image sensor. The algorithm involves comparing a first image with a second image after the second image has been translated or rotated. The algorithm used therein is clearly capable of determining the rotation of the pen as Badyal refers to determining that rotation by comparing successive images [col. 3, lines 37-41]. Hence, the device taught by Badyal is already capable of determining the rotation of the pen without any further teachings from Howard. The Examiner has not pointed to any teaching in the art that the scheme taught in Howard has any advantages over the scheme already present in Badyal.

The passage at col. 3, lines 42-61 cited by the Examiner as supporting the Examiner's contention that Badyal struggles with determining the rotation of the pen refers to calibrating

the pointing system to define the direction of motion of the cursor on the screen with respect to the direction of motion of the pen. The passage also states that the rotation of the pen by the user can be used as a signal to define the direction of motion. Hence, there is no teaching in Badyal that the device taught therein cannot determine the rotation of the pen, or that the operation thereof is hampered in any way by an inability to determine the rotation of the pen.

Claim 1 also requires that the reference mark system measures the orientation of the elongated body relative to the direction defined by the reference mark system. The system taught by Howard generates signals that only measure changes in the orientation of the glove relative to the defined direction. The system taught in Howard is an incremental optical encoder that generates a pulse each time the disk moves some predetermined angular distance. The Examiner has not pointed to any teaching in Howard that the device taught therein measures the orientation of the glove relative to the direction defined by the disk. While one could construct a system that provides such an absolute measurement by defining a predetermined reference position, the Examiner has not pointed to any such teaching in the references. Hence, such a teaching is not inherent in the references.

The device taught by Howard determines the orientation of a glove relative to a direction defined by the gravitational force acting on a weight. The information is used to control a cursor on a screen. There is no teaching in either Howard or Badyal that the comparison of the images taken by the device of Badyal could be modified if the orientation of the pen in Badyal was known from a separate measurement. Hence, the combined teachings of the two references do not teach the limitation that the comparison of the images depends on a measured orientation of the pen, no less the orientation provided by the reference system identified by the Examiner. Accordingly, Applicant submits that the Examiner has not made a *prima facie* case for obviousness with respect to Claim 1.

## 2. Rejection of Claims 2 and 3

The Examiner stated that Badyal and Howard disclose the pointing device of Claim 1 and that Howard further discloses a reference mark system that satisfies the additional limitations of Claim 2. Namely, that the reference mark system includes a sensor for determining the location of a reference mark on the disk relative to the elongated body. Specifically, the Examiner looks to the system shown in Figure 8b of Howard and identifies

weight 76 as the reference mark. Applicant must respectfully disagree with the Examiner's reading of the cited teachings in Howard.

The reference device taught in Howard consists of a disk that is weighted and turns when the orientation of the device is altered with respect to the earth. The disk turns an encoding wheel 72 having a set of identical marks on the wheel. The number of marks that pass sensor 78 are counted to determine the amount by which the hand moved since the last measurement; however, there is no teaching that the position of any particular mark is determined. The device measures the amount of change since the last position measurement, not the absolute position of the device to which the mechanism is attached. This device generates a signal that is analogous to that generated by a conventional computer mouse. Hence, the combined references do not teach all of the limitations of Claim 2. Accordingly, the Examiner has not made a *prima facie* case for obviousness with respect to Claim 2 or the claims dependent therefrom. The previous amendment to Claim 2 merely places the claim, as originally filed, in independent form.

### 3. Rejection of Claim 5

Claim 5 depends from Claim 2 and further requires that the sensor that determines the location of the reference mark relative to the elongated body include an optical system for projecting an image of the disk into the imaging system that forms images of the surface over which the pen is moved. The Examiner states that Howard teaches that the sensor forms an image of the disk because an LED-phototransistor pair is used to detect the reference marks on the disk. Applicant repeats the arguments made above with respect to the missing teachings in the references and Claim 2.

In addition, the device taught by Howard utilizes an encoding wheel that is rotated by the disk in question. The encoding wheel includes slots. A light source 77 projects a collimated beam of light that is interrupted by the slot pattern to generate a series of light pulses that are detected by element 78. This optical system does not form an image of the encoding wheel, no less the disk on which the weight is located, i.e., disk 75, as required by Claim 5. Furthermore, the Examiner has not pointed to any teaching that the "image" identified by the Examiner is formed or would be formed in the imaging sub-system used to form images of the surface. Accordingly, there are additional grounds for allowing Claim 5.

#### **4. Rejection of Claim 6**

The Examiner stated that Howard teaches a reference mark sensor that measures the orientation of the disk relative to the elongated body. First, Howard does not teach an elongated body. Second, as noted above, the system shown in Figure 8b measures changes in the orientation of the object to which the device is attached, not the absolute orientation. Hence, there are additional grounds for allowing Claim 6.

#### **C. Rejection of Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Badyal in view of Howard and further in view of Blonder**

Claim 4 depends from Claim 2 and further requires that the orientation sensor includes a magnet attached to the disk. The Examiner admits that Badyal in view of Howard does not teach such a magnet. The Examiner looks to Blonder as teaching a sensor having a magnet in a pointing device. The Examiner maintains that it would be obvious to replace the weight of Howard with a magnet according to Blonder so that the device could be used when gravity would be ineffective, such as movement perpendicular to the force of gravity.

First, the Examiner has not pointed to any teaching in Howard that a device that is independent of gravity is useful. The purpose of the device taught in Howard is to measure changes in the orientation of the user's hand relative to the direction of gravity. Hence, the resultant device would not provide the functionality to which the device in Howard is directed.

Second, Applicant repeats the arguments made above with respect to the missing teachings in Badyal and Howard relative to the rejection of Claim 2. Blonder does not provide the missing teachings. Accordingly, the Examiner has not made a *prima facie* case for obviousness with respect to Claim 4.

#### **VIII. CONCLUSION**

Appellants respectfully submit that for the reasons of fact and law argued herein, the decision of the Examiner in finally rejecting Claims 1-6 should be reversed.

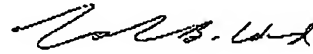
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Respectfully Submitted,



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Date: Oct. 3, 2006

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APPENDIX

**THE CLAIMS ON APPEAL:**

1. A pointing device comprising:

an elongated body having a transparent end adapted for movement over a surface;

an illumination subsystem that illuminates said surface in an area adjacent to said transparent end;

an imaging subsystem that forms images of a portion of said surface in said area;

a reference mark system that defines a direction that is independent of the rotations of said elongated body and measures the orientation of said elongated body relative to said direction; and

a controller that periodically compares two of said images, said comparison depending on the amount by which said elongated body rotated between said images as determined from said orientation.

2. A pointing device comprising:

an elongated body having a transparent end adapted for movement over a surface;

an illumination subsystem that illuminates said surface in an area adjacent to said transparent end;

an imaging subsystem that forms images of a portion of said surface in said area;

a reference mark system that defines a direction that is independent of the rotations of said elongated body; and

a controller that periodically compares two of said images, said comparison depending on the amount by which said elongated body rotated between said images,

wherein said reference mark system comprises:

a disk that is free to rotate about an axis through said disk, said disk comprising a reference mark that is displaced from said axis, said disk having an orientation mechanism that maintains said disk in a fixed orientation relative to the earth; and

a sensor for determining the location of said reference mark relative to said elongated body.

3. The pointing device of Claim 2 wherein said orientation mechanism comprises a weight on said disk, said weight being displaced from said axis.

4. The pointing device of Claim 2 wherein said orientation mechanism comprises a magnet attached to said disk.

5. The pointing device of Claim 2 wherein said sensor comprises an optical system for projecting an image of said disk into said imaging subsystem.

6. The pointing device of Claim 2 wherein said sensor comprises a reference mark sensor that measures the orientation of said disk relative to said elongated body.



**Evidence Appendix**

**none**

**Related Proceedings Appendix**

**none**

OCT 03 2006

**PATENT APPLICATION**  
Attorney Docket: 70020777-1

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF APPEALS**

Applicant:	Sun
Serial No.:	10/692,879
Filed:	10/23/2003
For:	Improved Pen Mouse
Group Art Unit:	2629
Examiner:	Boddie, William

**BRIEF FOR APPELLANT**

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This is an appeal from the decision of the Primary Examiner dated 08/08/2006, finally rejecting Claims 1-6 in the above-identified patent application.

**I. REAL PARTY IN INTEREST**

The real party in interest is Avago Technologies, LTD. having an address as indicated below.

**II. RELATED APPEALS AND INTERFERENCES**

There are no other appeals or interferences known to appellant, the appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in this pending appeal.

**III. STATUS OF THE CLAIMS**

Claims 1-6 are currently pending in the above-identified patent application. In the Office Action dated 08/08/2006, the Examiner rejected Claims 1-6 and indicated that the Action was final.

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**IV. STATUS OF AMENDMENTS**

No amendments have been filed since the above-described final rejection.

**V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

With respect to Claim 1, refer to Figure 2, and the discussion thereof that begins on page 4 at line 19. The present invention includes a pointing device 20 that includes an elongated body 21 having a transparent end adapted for movement over a surface 13. The pointing device includes an illumination subsystem 24 that illuminates the surface in an area adjacent to the transparent end 22. An imaging subsystem 23 forms images of a portion of the surface in the area. A reference mark system 25-27 defines a direction that is independent of the rotations of the elongated body. The reference mark's position relative to the elongated body is determined by the image subsystem in the embodiment shown in Figure 2. A controller 28 periodically compares two of the images formed by the image subsystem in a manner that depends on the amount by which the elongated body rotated between the images as determined from the orientation measured by the reference mark system.

With reference to Claim 2, the reference mark system includes a disk 25 that is free to rotate about an axis 27 through the disk. The disk includes a reference mark 26 that is displaced from the axis, the disk having an orientation mechanism that maintains the disk in a fixed orientation relative to the earth. The reference mark system includes a sensor for determining the location of the reference mark relative to the elongated body. This function can be provided by the sensor in the imaging subsystem or a separate sensor 43 shown in Figure 4.

With respect to Claim 3, the orientation mechanism includes a weight on the disk that is displaced from the axis as shown in Figure 5 at 51.

With respect to Claim 4, the orientation mechanism includes a magnet attached to the disk as shown at 63 in Figure 6 and discussed starting on page 6 at line 26.

With respect to Claim 5, the sensor used to measure the position of the reference mark includes an optical system for projecting an image of the disk into the imaging subsystem.

See Figure 3, specifically mirror 34 and reference mark system 31-33 and the discussion thereof that begins on page 5 at line 26.

With respect to Claim 6, the sensor includes a reference mark sensor 43 that measures the orientation of the disk relative to the elongated body as shown in Figure 4.

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

A. Rejection of Claims 1-3 and 5-6 under 35 U.S.C. 103(a) as being unpatentable over Badyal, *et al* (hereafter "Badyal") (US 6,151,015) in view of Howard (US 6,097,374).

B. Rejection of Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Badyal in view of Howard and further in view of Blonder (US 5,620,371)

## **VII. ARGUMENT**

### **A. Examiner's Burden under 35 U.S.C. 103**

The Examiner has the burden of showing that the combined teachings of the references teach all of the limitations of the claim being rejected. If the combined references do not teach a limitation, the Examiner must show that there is some suggestion in the art that would cause someone of ordinary skill to modify the teachings of the reference to arrive at the limitation in question. In addition, the Examiner must show that there is some suggestion in the art that would cause someone of ordinary skill to combine the teachings of the references and that the art reveals that there is a reasonable expectation of success in making the suggested combination. "The mere fact that a reference could be modified to produce the patented invention would not make the modification obvious unless it is suggested by the prior art." (*Libbey-Owens-Ford v. BOC Group*, 4 USPQ 2d 1097, 1103). "When the PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where such a teaching or suggestion appears in the reference" (*In re Rijckaert*, 28 USPQ2d, 1955, 1957). Where the claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under section 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in

so making or carrying out, those of ordinary skill would have a reasonable expectation of success. Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure. *In re Vaack*, 20 USPQ2d 1438, 1442(CAFC 1991).

**B. Rejection of Claims 1-3 and 5-6 under 35 U.S.C. 103(a) as being unpatentable over Badyal in view of Howard**

**1. Rejection of Claim 1**

The Examiner looks to Badyal as teaching a pen-like pointing device that satisfies the limitations of Claim 1 with the exception of the reference mark system and comparing the two images in a manner that depends on the amount by which the body rotated between the images. The Examiner looks to Howard for the missing teaching.

The Examiner looks to Howard as providing the teaching of a reference system that defines a direction that is independent of the rotations of a body. According to the Examiner, one would be motivated to include the reference mechanism of Howard in the pointing device of Badyal because doing so would allow more flexibility to the user and allow rotation of the pen within the user's grasp. The Examiner maintains that Badyal "struggles" with determining the rotation of the pen, and hence, one would be motivated to include the system taught in Howard to provide a mechanism for determining the rotation.

First, contrary to the Examiner's view, Badyal does not struggle with determining the rotation of the pen. Badyal teaches a pen like pointing device in which the rotation of the pen is determined by comparing successive frames recorded by the image sensor. The algorithm involves comparing a first image with a second image after the second image has been translated or rotated. The algorithm used therein is clearly capable of determining the rotation of the pen as Badyal refers to determining that rotation by comparing successive images [col. 3, lines 37-41]. Hence, the device taught by Badyal is already capable of determining the rotation of the pen without any further teachings from Howard. The Examiner has not pointed to any teaching in the art that the scheme taught in Howard has any advantages over the scheme already present in Badyal.

The passage at col. 3, lines 42-61 cited by the Examiner as supporting the Examiner's contention that Badyal struggles with determining the rotation of the pen refers to calibrating

the pointing system to define the direction of motion of the cursor on the screen with respect to the direction of motion of the pen. The passage also states that the rotation of the pen by the user can be used as a signal to define the direction of motion. Hence, there is no teaching in Badyal that the device taught therein cannot determine the rotation of the pen, or that the operation thereof is hampered in any way by an inability to determine the rotation of the pen.

Claim 1 also requires that the reference mark system measures the orientation of the elongated body relative to the direction defined by the reference mark system. The system taught by Howard generates signals that only measure changes in the orientation of the glove relative to the defined direction. The system taught in Howard is an incremental optical encoder that generates a pulse each time the disk moves some predetermined angular distance. The Examiner has not pointed to any teaching in Howard that the device taught therein measures the orientation of the glove relative to the direction defined by the disk. While one could construct a system that provides such an absolute measurement by defining a predetermined reference position, the Examiner has not pointed to any such teaching in the references. Hence, such a teaching is not inherent in the references.

The device taught by Howard determines the orientation of a glove relative to a direction defined by the gravitational force acting on a weight. The information is used to control a cursor on a screen. There is no teaching in either Howard or Badyal that the comparison of the images taken by the device of Badyal could be modified if the orientation of the pen in Badyal was known from a separate measurement. Hence, the combined teachings of the two references do not teach the limitation that the comparison of the images depends on a measured orientation of the pen, no less the orientation provided by the reference system identified by the Examiner. Accordingly, Applicant submits that the Examiner has not made a *prima facie* case for obviousness with respect to Claim 1.

## **2. Rejection of Claims 2 and 3**

The Examiner stated that Badyal and Howard disclose the pointing device of Claim 1 and that Howard further discloses a reference mark system that satisfies the additional limitations of Claim 2. Namely, that the reference mark system includes a sensor for determining the location of a reference mark on the disk relative to the elongated body. Specifically, the Examiner looks to the system shown in Figure 8b of Howard and identifies

weight 76 as the reference mark. Applicant must respectfully disagree with the Examiner's reading of the cited teachings in Howard.

The reference device taught in Howard consists of a disk that is weighted and turns when the orientation of the device is altered with respect to the earth. The disk turns an encoding wheel 72 having a set of identical marks on the wheel. The number of marks that pass sensor 78 are counted to determine the amount by which the hand moved since the last measurement; however, there is no teaching that the position of any particular mark is determined. The device measures the amount of change since the last position measurement, not the absolute position of the device to which the mechanism is attached. This device generates a signal that is analogous to that generated by a conventional computer mouse. Hence, the combined references do not teach all of the limitations of Claim 2. Accordingly, the Examiner has not made a *prima facie* case for obviousness with respect to Claim 2 or the claims dependent therefrom. The previous amendment to Claim 2 merely places the claim, as originally filed, in independent form.

### 3. Rejection of Claim 5

Claim 5 depends from Claim 2 and further requires that the sensor that determines the location of the reference mark relative to the elongated body include an optical system for projecting an image of the disk into the imaging system that forms images of the surface over which the pen is moved. The Examiner states that Howard teaches that the sensor forms an image of the disk because an LED-phototransistor pair is used to detect the reference marks on the disk. Applicant repeats the arguments made above with respect to the missing teachings in the references and Claim 2.

In addition, the device taught by Howard utilizes an encoding wheel that is rotated by the disk in question. The encoding wheel includes slots. A light source 77 projects a collimated beam of light that is interrupted by the slot pattern to generate a series of light pulses that are detected by element 78. This optical system does not form an image of the encoding wheel, no less the disk on which the weight is located, i.e., disk 75, as required by Claim 5. Furthermore, the Examiner has not pointed to any teaching that the "image" identified by the Examiner is formed or would be formed in the imaging sub-system used to form images of the surface. Accordingly, there are additional grounds for allowing Claim 5.



#### **4. Rejection of Claim 6**

The Examiner stated that Howard teaches a reference mark sensor that measures the orientation of the disk relative to the elongated body. First, Howard does not teach an elongated body. Second, as noted above, the system shown in Figure 8b measures changes in the orientation of the object to which the device is attached, not the absolute orientation. Hence, there are additional grounds for allowing Claim 6.

#### **C. Rejection of Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Badyal in view of Howard and further in view of Blonder**

Claim 4 depends from Claim 2 and further requires that the orientation sensor includes a magnet attached to the disk. The Examiner admits that Badyal in view of Howard does not teach such a magnet. The Examiner looks to Blonder as teaching a sensor having a magnet in a pointing device. The Examiner maintains that it would be obvious to replace the weight of Howard with a magnet according to Blonder so that the device could be used when gravity would be ineffective, such as movement perpendicular to the force of gravity.

First, the Examiner has not pointed to any teaching in Howard that a device that is independent of gravity is useful. The purpose of the device taught in Howard is to measure changes in the orientation of the user's hand relative to the direction of gravity. Hence, the resultant device would not provide the functionality to which the device in Howard is directed.

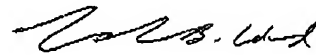
Second, Applicant repeats the arguments made above with respect to the missing teachings in Badyal and Howard relative to the rejection of Claim 2. Blonder does not provide the missing teachings. Accordingly, the Examiner has not made a *prima facie* case for obviousness with respect to Claim 4.

#### **VIII. CONCLUSION**

Appellants respectfully submit that for the reasons of fact and law argued herein, the decision of the Examiner in finally rejecting Claims 1-6 should be reversed.

I hereby certify that this paper (along with any others attached hereto) is being sent in triplicate via facsimile to fax number: 571-273-8300

Respectfully Submitted,



Calvin B. Ward  
Registration No. 30,896  
Date: Oct. 3, 2006

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**THE CLAIMS ON APPEAL:**

1. A pointing device comprising:

an elongated body having a transparent end adapted for movement over a surface;

an illumination subsystem that illuminates said surface in an area adjacent to said transparent end;

an imaging subsystem that forms images of a portion of said surface in said area;

a reference mark system that defines a direction that is independent of the rotations of said elongated body and measures the orientation of said elongated body relative to said direction; and

a controller that periodically compares two of said images, said comparison depending on the amount by which said elongated body rotated between said images as determined from said orientation.

2. A pointing device comprising:

an elongated body having a transparent end adapted for movement over a surface;

an illumination subsystem that illuminates said surface in an area adjacent to said transparent end;

an imaging subsystem that forms images of a portion of said surface in said area;

a reference mark system that defines a direction that is independent of the rotations of said elongated body; and

a controller that periodically compares two of said images, said comparison depending on the amount by which said elongated body rotated between said images,

wherein said reference mark system comprises:

a disk that is free to rotate about an axis through said disk, said disk comprising a reference mark that is displaced from said axis, said disk having an orientation mechanism that maintains said disk in a fixed orientation relative to the earth; and

a sensor for determining the location of said reference mark relative to said elongated body.

3. The pointing device of Claim 2 wherein said orientation mechanism comprises a weight on said disk, said weight being displaced from said axis.

4. The pointing device of Claim 2 wherein said orientation mechanism comprises a magnet attached to said disk.

5. The pointing device of Claim 2 wherein said sensor comprises an optical system for projecting an image of said disk into said imaging subsystem.

6. The pointing device of Claim 2 wherein said sensor comprises a reference mark sensor that measures the orientation of said disk relative to said elongated body.

**Evidence Appendix**

**none**

**Related Proceedings Appendix**

**none**